

# Recommendations for the PJM Reserve Markets

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Catherine Tyler



Monitoring Analytics

# PJM Reserve Markets

- **Synchronized Reserves**
  - Tier 1
  - Tier 2
- **Nonsynchronized Reserves**
- **Day Ahead Scheduling Reserves**

# Tier 1

- **Cost of providing tier 1 is zero.**
- **Payment based on tier 2 clearing price is a windfall.**
- **No performance obligation**
  - **50.5 percent response rate to events in 2017.**
- **PJM tier 1 biasing is an administrative operator intervention that affects clearing prices and scarcity determination without adequate transparency.**

# Tier 1 Recommendations

- **Eliminate payment of tier 2 price.**
- **Define rules for tier 1 biasing.**
- **No payment if resource deselected by PJM (Adopted)**
- **Or simply get rid of tier 1.**

# The tier 2 synchronized reserve market results were competitive.

Market Element	Evaluation	Market Design
Market Structure: Regional Markets	Not Competitive	
Participant Behavior	Competitive	
Market Performance	Competitive	Mixed

## Tier 2

- **Local and aggregate market power exist.**
  - **Cost based market mitigates market power.**
- **Must offer requirement**

## Tier 2 Recommendations

- **Enforce must offer requirement.**
- **Remove \$7.50 margin and heat rate degradation from cost-based offer.**
- **Use five minute LMP and lost opportunity cost to determine price (Adopted).**

# The day-ahead scheduling reserve market results were competitive.

Market Element	Evaluation	Market Design
Market Structure	Not Competitive	
Participant Behavior	Mixed	
Market Performance	Competitive	Mixed



# Secondary Reserves - DASR

- **No performance obligation**
- **Must offer market**
- **Cost of providing DASR is zero, unless LOC.**
- **Aggregate market power**
  - **DASR market has three or fewer pivotal suppliers in 15.9 percent of hours.**
  - **Economic withholding, daily average of 39.2 percent of units offer above zero.**

# Secondary Reserves Recommendations

- **Add a real-time performance obligation.**
- **Apply market power mitigation.**
- **Document reasons for expanding requirement.**



# Operating Reserve Demand Curve Recommendations

- **Reassess zonal requirements**
- **Cascading scarcity prices as reserve products go short**
- **Downward sloping curve based on loss of load probability**
- **Shifting reserve requirements to capture operator actions**

**Monitoring Analytics, LLC**

**2621 Van Buren Avenue**

**Suite 160**

**Eagleville, PA**

**19403**

**(610) 271-8050**

**[MA@monitoringanalytics.com](mailto:MA@monitoringanalytics.com)**

**[www.MonitoringAnalytics.com](http://www.MonitoringAnalytics.com)**

